

ENERGY LITERACY RESOURCE PACKAGE

Learning Activities for New Brunswick K-2 Educators & Primary Learners

November 2023

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Overview

The purpose of this resource package is to provide lessons and materials for K-2 educators to build energy literacy foundations and to explore the basic principles of energy. The activities and materials support New Brunswick's Holistic Curriculum Framework in the subject areas of *Explore Your World*, *English Language Arts*, *Mathematics*, and *Physical Education*, as well as all Global Competencies: *Critical Thinking and Problem Solving*, *Communication*, *Collaboration*, *Fostering and Teaching Self Awareness and Self-Management*, *Sustainable and Global Citizenship*, and *Innovation and Entrepreneurship*.

This package includes 3 Learning Activities that are to be delivered in order, as each one builds upon prior knowledge and previous activities:

1. What Is Energy?
2. How Do We Use Energy Every Day?
3. Are We Saving Energy? Are We Wasting Energy?

Acknowledgements

The materials provided were prepared in support and partnership with:

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Energy Literacy Resource Package

Learning Activities Summary: With an introduction to the ideas of energy, students discuss and explore what energy is, how we use it, and how we can save it in our everyday routines. Included are hands-on, experiential activities, science experiments, read alouds, and opportunities for outdoor learning.

	Lesson 1 What Is Energy?	Lesson 2 How Do We Use Energy Every Day?	Lesson 3 Are We Saving Energy OR Are We Wasting Energy?
Materials	<ul style="list-style-type: none"> • PowerPoint – What Is Energy? • Mystery Bags (with Push-Back Car, Slinky, and Glowsticks) • Read Aloud – <i>Tap the Magic Tree</i> • Ice or snow (1 small piece) • Chart Paper (<i>not included</i>) • Marker (<i>not included</i>) 	<ul style="list-style-type: none"> • PowerPoint – How Do We Use Energy Every Day? • Community Energy Walk Bingo activity sheets (<i>1 per small groups of 3-4</i>) • Clipboards • Dry Erase Marker (<i>1 per small groups of 3-4</i>) • Binoculars (<i>1 per small group</i>) • Pencils (<i>not provided</i>) • Read Aloud • Post-It Notes (<i>2 per learner</i>) • Read Aloud: <i>Energy Makes Things Happen</i> 	<ul style="list-style-type: none"> • PowerPoint – Are We Saving Energy? Are We Wasting Energy? • 6 Save/Waste Posters • Dry Erase Markers • Energy Meter Readers • Energy Cards (<i>1 set per small groups of 3-4</i>) • Paper for Posters (<i>not provided</i>) • Colouring Materials (<i>not provided</i>) • Read Aloud – <i>Old Enough to Save the Planet</i>
Vocabulary	<ul style="list-style-type: none"> • Energy • Change • Work • Motion • Light • Growth • Thermal Energy (heat) • Sound 	<ul style="list-style-type: none"> • Energy • Change • Work • Motion • Light • Growth • Thermal Energy (heat) • Sound 	<ul style="list-style-type: none"> • Saving Energy • Wasting Energy • Environment • Habits • Community • Environmental Responsibility • Climate Change

Curriculum Connections

- English Language Arts
- Explore Your World
- Mathematics

Global Competencies



Collaboration



Communication



Critical Thinking & Problem-Solving



Innovation, Creativity & Entrepreneurship



Fostering and Teaching Self-Awareness and Self-Management







Sustainability and Global Citizenship

1: What Is Energy?

Topic: Energy Fundamentals

Overview: The simplest definition of energy is "**the ability to do work**". Energy is how things change and move. It's everywhere around us and it takes on all sorts of forms. It takes energy to cook food, to drive to school, and to jump in the air.

<p>Materials</p>	<ul style="list-style-type: none"> • PowerPoint Presentation: <i>What Is Energy?</i> • Newton's Cradle • Mystery Bag (<i>Per Bag</i>): 1 push-back car, 2 Slinkies, 4 Glow Sticks • Chart paper (<i>not included</i>) • Marker (<i>not included</i>) • Ice or snow (1 small ice cube or ball of snow) • Read Aloud – "<i>Tap the Magic Tree</i>" by: Christie Matheson
<p>Vocabulary</p>	<ul style="list-style-type: none"> ○ Energy ○ Change ○ Motion ○ Light ○ Growth ○ Thermal Energy (heat) ○ Sound
<p>Curriculum Connections</p>	<p>English Language Arts:</p> <ul style="list-style-type: none"> • <i>Strand:</i> Interactions - <i>Big Idea:</i> Exchanges - <i>Skill Descriptor:</i> Respond personally to presentations, oral stories, and multi-modal text. <p>Explore Your World:</p> <ul style="list-style-type: none"> • <i>Strand:</i> Play and Playfulness - <i>Big Idea:</i> Exploration and Problem-Solving - <i>Skill Descriptor:</i> Gather evidence to create and answer questions. • <i>Strand:</i> Play and Playfulness - <i>Big Idea:</i> Play and Inquiry - <i>Skill Descriptor:</i> Ask questions of each other, tinker, wonder, and prompt new play.
<p>Global Competencies</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Collaboration</p> </div> <div style="text-align: center;">  <p>Communication</p> </div> <div style="text-align: center;">  <p>Critical Thinking & Problem-Solving</p> </div> <div style="text-align: center;">  <p>Innovation, Creativity & Entrepreneurship</p> </div> </div>

Instructions

1. **EXPLORATION WITH ICE OR SNOW:** Hold a piece of ice or snow in the palm of your hand. Ask learners: *What do you see changing?* Allow them to respond. Then, form a fist and ask the learners to count down from 10-0. [*The ice or snow should be melting.*] Repeat: *What do you see changing?* Allow learners to share their responses. Then, ask: *What other things do we see change around us?* Discuss and share possible answers such as: seasons, people, weather, time, etc.
2. **READ ALOUD - TAP THE MAGIC TREE** by Christie Matheson: Before reading, discuss what changes trees go through during the four seasons, by looking closely at the front cover. Invite learners to interact with the book as you read. Have volunteers "Tap" and see what happens on the next page. After reading, have learners share something that changed in the story.



3. **POWERPOINT PRESENTATION - What Is Energy?: Lesson 1:** Using Slide 2 of the PPT, have learners share something that changed in the story. Next, display the Newton's Cradle. Have learners experiment and tinker with the Newton's Cradle to see if they can determine what is changing. [Educators – this type of energy – the ball is moving potential energy (kinetic energy) – by moving back and forth. This energy type is motion.] After time to explore, discuss with learners: *What is changing when 1 ball is lifted and let go of? What is changing when 2 balls are lifted and let go of? What is changing to all the balls?* Allow learners to try different amounts of balls (1, 2, 3) and discover what is changing.



Using Slide 3, have learners identify "What is Changing?" in the four corners of the slide. Ask: *"If energy makes change, what kind of changes do we see here?"* [seed to tree, baby to adult, egg to frog, egg to bird].

4. **MYSTERY BAG ACTIVITY:** Place learners in groups of 3-4. Explain that each group will have one bag to share. Before handing out the mystery bags, discuss the importance of taking turns, fairness, as well as respecting and caring for the materials about to be used. It's also important to remind learners that you will give them clear instructions on **what** to open and **when** to open it.

a) Have each group take out the pull-back car. Have learners experiment and tinker with the car to see if they can determine what is changing. [Educators – this type of energy – the car is moving potential energy (kinetic energy) – by moving back and going forward. This energy type is motion.] After time to explore, discuss with learners: *What is changing when we pull back the car? How far did your car go?*

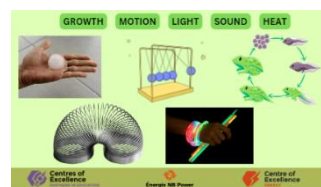
B) Have them uncover the [Slinky] – The slinky is to be used with a partner. Allow learners to explore how it changes (examples: stretch, pull, swing it like a rope, release, drop from the table to chair to floor; encourage them to "listen" to it as it moves). {Educators: This is a type

of sound and motion energy.] Discuss: *What is changing? How did it change as you _____ (insert motion) it? Do you notice anything with your ears?*

C) Have them open the pencil case [Glow Sticks] - Each learner holds a glow stick in their hands. First, turn off the lights and talk about what changed. Then, turn the lights back on. Next, have students **break** the glow sticks, turn the lights off, and discuss what has changed as you turn the lights back on. [Educators: This is a type of light energy.]

D) Have learners gather items and place them back in the box with care. Gather all learners in a common area to reflect on the activities. Discuss: *What surprised you most? What did you notice changing?*

5. **REFLECTION:** Have learners talk about what changes they saw from the beginning of this lesson: ice/snow activity, read aloud, to the Mystery Bag by using slide 4 of the PowerPoint Presentation. Have learners make a match between the changes they observed and the types of energy. Example: *What activity or items did we see changes in motion? Which items/activities were changing how something moved?* After discussion, go to Slide 5 to reveal the answers.



6. **VIDEO – What is Energy?:** Wrap up the class by watching the 4-minute video about energy on Slide 6 of the PowerPoint Presentation.

Definitions – For Educators

MOTION IS ENERGY: Many things are moving. They are in motion. Motion is a change in an objects position. Motion takes energy. Nothing can move without energy. For example, leaves falling from trees. *What gives you the energy to move? (Energy in the food we eat)*

GROWTH IS ENERGY: Every living thing is growing all the time. They grow new cells to replace old ones. Sometimes they do not get bigger, but they still grow. For example, plants – they start as a small seed but grow into a larger plant with stems and leaves above the ground and roots below ground. *What do you see growing?*

LIGHT IS ENERGY: We use light energy every day. We use it to see things. Without light, our lives would be different and darker. Doctors use special light to help in surgery. *Why is light important to us?*

SOUND IS ENERGY: Sound is energy in the form of sound waves. Soundwaves are everywhere. Close your eyes, hold very still and listen for a moment. *How many different sounds can you hear?* Sound is energy vibrating. All sounds are caused by vibrations. *How is sound important to us? (Communication, music, entertainment via phone, radio, tv, etc.)*





HEAT (THERMAL) IS ENERGY: We use heat, called thermal energy. We cannot see heat, but we can feel it. Our bodies make heat just like our stoves and lights do too. We heat our houses, our food,

air, and water. Sometimes there is too much heat, and we move it. Air conditioners take heat from inside the house and move it outside. *How is heat important to us? What other things make heat? How do you keep your house warmer in the winter?*

2: How Do We Use Energy Everyday?

Topic: Energy In Our Lives

Overview: Building on the energy foundations developed in lesson 1, learners will explore and discuss how we use energy at school, in the community, and at home.

<p>Materials</p>	<ul style="list-style-type: none"> • PowerPoint • Post it Notes (2 per learner) • Binoculars (1 per small group of 3-4 learners) • Clipboards (1 per small group) • Community Energy Walk BINGO Activity (laminated BINGO sheet, 1 per small group) • White board markers with eraser (1 per small group) • Optional Energy at Home Scavenger Hunt Printable Sheet (1 per learner) • Read Aloud: <i>Energy Makes Things Happen</i> (by: Kimberley Brubaker Bradley)
<p>Vocabulary</p>	<ul style="list-style-type: none"> ○ Energy ○ Change ○ Work ○ Motion ○ Light ○ Growth ○ Thermal Energy (heat) ○ Sound
<p>Curriculum Connections</p>	<p>English Language Arts:</p> <ul style="list-style-type: none"> • <i>Strand:</i> Interactions - <i>Big Idea:</i> Exchanges - <i>Skill Descriptor:</i> Respond personally to presentations, oral stories, and multi-modal text. <p>Explore Your World:</p> <ul style="list-style-type: none"> • <i>Strand:</i> Play and Playfulness - <i>Big Idea:</i> Exploration and Problem-Solving - <i>Skill Descriptor:</i> Gather evidence to create and answer questions.
<p>Global Competencies</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Collaboration</p> </div> <div style="text-align: center;">  <p>Communication</p> </div> <div style="text-align: center;">  <p>Critical Thinking & Problem-Solving</p> </div> <div style="text-align: center;">  <p>Innovation, Creativity & Entrepreneurship</p> </div> </div>

Instructions

1. **REVIEW:** Review the knowledge and experiences gained from the previous lesson on “What is Energy?” by referring to Slide 8 of PowerPoint presentation. Discuss and review with learners the five types of energy, all around us every day, by having them match the photograph with the type of energy. (Motion, Heat, Sound, Growth, Light)



1. Example: Race Car = Motion energy

(Plant = growth energy, streetlamp = light energy, fire = heat/thermal energy, rock concert = sound energy)

2. **CLASSROOM HUNT:** Hand out **2** post-it notes per learner. Ask learners to walk around the classroom and place their post-it notes on items in the classroom that use energy. Remind them that **there can only be one post-it note per item**. [For example: The light switch by the classroom door can only have one sticky note.]

Additional Examples: electrical outlets, bell/instrument, fire alarm, plants, listening station, electric pencil sharpener, pets, learners themselves – moving around the room, Smart Board, fan, dice, trucks/cars, etc.

In 5 -10 minutes, gather and ask learners: *Who has post it notes left? Are there things that were missed?* Choose a few learners to get up and share where they placed their post-it notes and what type of energy it uses. [For example: *I put a post-it note on our class plant because it uses growth energy to get bigger.*] Count up how many devices were discovered!

Extension Idea (Optional):

- Have the learners record the number of outlets that are in the room or in a portion of the school.
 - Have learners walk through the school and discover all the sources of energy that are in the school.
3. **COMMUNITY ENERGY WALK BINGO ACTIVITY:** Explain to learners they are going on a Community Energy Walk. You decide on the best outdoor route for your learners, aiming for 15-20 minutes with multiple buildings and sites to see, if possible. Learners will share a pair of binoculars, a clipboard with a BINGO sheet, and a white board marker. Put learners into small groups of 3-4. They will also need appropriate outdoor attire to match current weather conditions.

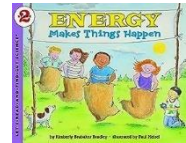
Read over the BINGO squares on Slide 9 of the PowerPoint Presentation.

(Please note: There are 4 varieties of BINGO cards.) The Community Energy Walk will allow learners to observe different types of energy



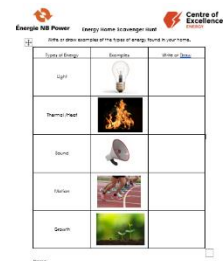
outdoors, while trying to get a BINGO. Do a class vote on the ways to get BINGO on this walk: horizontal, vertical, diagonal, or a full card. Before heading outside, answer any questions learners may have. Give learners time to get ready and get in line 2x2 (standing by their partner). Enjoy the walk and observing!

4. **SHARING** - Upon returning to the classroom, invite learners to take turns and share how they got their BINGO. Discuss: *What did you see? How many found light energy? Etc.*
5. **READ ALOUD** – **Energy Makes Things Happen (by: Kimberley Brubaker Bradley):** Read this story, allowing time at the end for learners to reflect, not only on the book, but on this Lesson #2, as well.



Home Activity (Optional):

Energy at Home Scavenger Hunt- Invite learners to take a copy of the printable (included) with them, as they explore their own home and the types of energy that they find. Learners can return the next day and share with classmates.









3: Are We Saving Energy OR Are We Wasting Energy?

Topic: Personal Energy Consumption

Overview: Building on the two previous lessons on energy, learners will discuss how we can save energy and not waste it.

Materials	<ul style="list-style-type: none"> • PowerPoint – Are We Saving Energy OR Are We Wasting Energy? • 6 Save/Waste Posters (<i>to put up around the classroom</i>) • 6 Dry-Erase Markers • 4 Energy Meter Readers • Energy Cards (<i>1 set per small group of 4-5 learners</i>) • Variety of paper for posters: cardstock, construction paper, or white paper (<i>not included</i>) • Colouring materials: markers, crayons, pencils (<i>not included</i>) • Book: <i>Old Enough to Save the Planet</i> (by: Loll Kirby)
Vocabulary	<ul style="list-style-type: none"> • Energy • Energy Saving – use it less • Wasting Energy – using more than we need • Change • Work

	<ul style="list-style-type: none"> • Motion • Light • Growth • Thermal Energy (heat) • Sound
Curriculum Outcomes	<p>English Language Arts:</p> <ul style="list-style-type: none"> • <i>Strand:</i> Representations - <i>Big Idea:</i> Composition <i>Skill Descriptor:</i> Organize ideas and create written or media texts. <p>Explore Your World:</p> <ul style="list-style-type: none"> • <i>Strand:</i> Play and Playfulness - <i>Big Idea:</i> Exploration and Problem-Solving - <i>Skill Descriptor:</i> Gather evidence to create and answer questions. • <i>Strand:</i> Well-Being - <i>Big Idea:</i> Belonging and Interconnectedness - <i>Skill Descriptor:</i> Examine how natural resources are connected to us and our environment. <p>Mathematics:</p> <ul style="list-style-type: none"> • <i>Strand:</i> Number - <i>Big Idea:</i> Number Sense - <i>Skill Descriptor:</i> Describe whole numbers.
Global Competencies	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Collaboration</p> </div> <div style="text-align: center;">  <p>Communication</p> </div> <div style="text-align: center;">  <p>Critical Thinking & Problem-Solving</p> </div> <div style="text-align: center;">  <p>Innovation, Creativity & Entrepreneurship</p> </div> <div style="text-align: center;">  <p>Fostering and Teaching Self-Awareness and Self-Management</p> </div> <div style="text-align: center;">  <p>Sustainability and Global Citizenship</p> </div> </div>

Instructions

1. REVIEW (Optional) – Give learners the opportunity to share their findings from the optional activity “Energy at Home Scavenger Hunt”. Together, have other learners think of examples of that are in their home, too.
2. Saving OR Wasting: Using Slide 11 from the PowerPoint presentation, ask learners what it means to save energy and what it means to waste energy. Have them share examples. [Saving Energy means that we are using less energy. Wasting energy means we are using more than what we need. Examples: Turn the lights of when we leave a room is an example of saving energy OR leaving the lights on in the room when we are NOT there is an example of wasting energy.]
3. POSTER & TALLY ACTIVITY: “Are we saving energy or are we wasting energy?” – Tape up the 6 posters in different areas of the classroom. Each poster has an energy scenario on it. Learners can read the poster and then can cast their vote on whether the scenario is saving energy or wasting energy putting a tally mark in the matching box on the poster. Allow learners to visit all 6 posters.

4. TALLY UP & SHARE: Gather and discuss the scenarios with the learners. Tally up the data and have a discussion with each energy scenario. Some possible questions: *Looking at our answers, we feel like this is a situation of wasting energy. Who would like to share their thinking? Looking at the tallies, some of us think this is a situation of saving energy and some of us think this is a situation of wasting energy. Who can share their thinking and what they voted?*
5. ENERGY DETECTIVES: Show learners the portable energy meter and explain what it measures. Using your own laptop, model how to plug it into an electrical device and measure the energy it uses. Discuss what a watt is (*a measure of electrical power*). Note: The Energy Meter Reader needs to be plugged into an outlet to work. Once another device is inserted into the 3-prong outlet, be sure to *press the middle gray button "WATT"* to see how many watts the electrical device uses on average when being used.

Divide learners into groups of 3-4. Hand each group a set of energy cards, which show examples of devices that have already been measured. Challenge the students to put them in order from least to greatest. Discuss: *Which item uses the most energy? Which item uses the least amount of energy? Were there any surprises?*

In the same groups, have learners use a portable energy meter to find and measure **3** more electrical devices within the classroom (if desired, extend beyond the classroom). Once measured, learners will create their own energy cards to add to the seven they already have. Have learners place their created cards in the correct place along the least to greatest continuum they have formed.

Examples of Electrical Devices:

- Smart board
- iPad
- Laptop
- Pencil Sharpener
- Lamp
- Listening Station
- Aquarium
- Portable Refrigerator
- Microwave

Once learners are finished creating their Energy card and placing their card in the least to greatest line, encourage all learners to "walk and talk" and see what their classmates measured and discovered. Together, discuss: *Did any groups measure an electrical device that used a lot of energy? Did any groups measure an electrical device that did NOT use a lot of energy? How many of us use these electrical devices every day?*

6. ART ACTIVITY - Take a moment and discuss ways that could save energy on the higher use products. Discuss: *How can we make sure we are not wasting energy daily?* [Some answers may

be using the product less frequently, only plugging it in when being used, drying clothes on a drying rack instead of always using the dryer, etc.]

Using various papers and colouring materials, have learners each create their own poster with 1 tip or 1 action that anyone could do to save energy each day while showing Slide 12 of the PowerPoint Presentation. [Please note: Feel free to allow learners to create these posters with technology using Canva, as well.] Discuss: “If you had to tell someone one thing about saving energy or not wasting it, what would you tell them”. Explain to learners that this is what should be highlighted on their poster.

7. WRAP-UP: READ ALOUD- *Old Enough to Save the Planet* (By: Loll Kirby) – Wrap up this 3-part learning activity reading about other young learner’s real-life stories of action. Pre-reading, discuss: *Saving energy is one way to help fight against Climate Change. How do you think it does that?* Have learners discuss Climate Change and give examples on how saving energy can help combat that. Then, read the stories – clap and cheer for each young person’s brave actions. After reading, have learners share their most favourite thing that they have learned from this energy literacy unit.



Extension Ideas

Share with others your NEW knowledge and energy experiences!

For example:

- Share energy saving tips on morning school announcements!
- Share posters and knowledge with a younger class.
- Ask permission to put your posters up around the school!
- Have an energy-savings day at your school.
- Have a lights-free hour built-in to your school day